



The Mars Exploration Rover Mission

Mars Exploration Rover Mission

- Scientific goals:** search for and characterize a wide range of rocks and soils that hold clues to past water activity on Mars
- Part of NASA's Mars Exploration Program which includes three previous successful landers: the two Viking landers in 1976 and Pathfinder in 1997, and now Mars Phoenix in 2008
- Total cost of building, launching, landing and operating the rovers for the initial 90 sol -long primary mission: \$820 million
- Both rovers still functioning over four years after landing!

Mission timeline

Mars Exploration Rover Mission

- Launched separately in summer 2007 on Delta II rockets
- Landed January 2004 on opposite sides of Mars

Opportunity launch July 7, 2003

Rover design

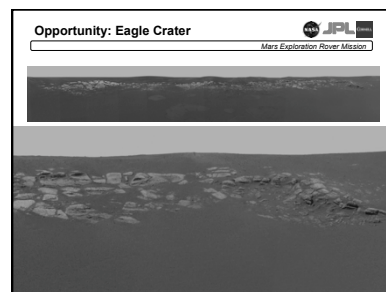
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Labels: PMA (pancam mast assembly), UHF and X-band antennas, 72-cell solar panels, IDD (instrument deployment device), 6-wheel rocker-bogie design, wheel diameter=10"

Athena science payload

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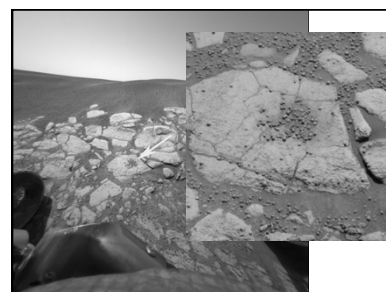
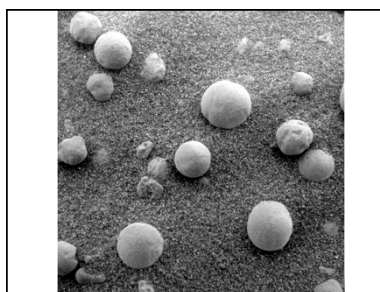
Labels: Pancam (2), miniTES, RAT, MI, APXS, Mössbauer, Navcam (2), Forward and rear Hazcams (fisheye)

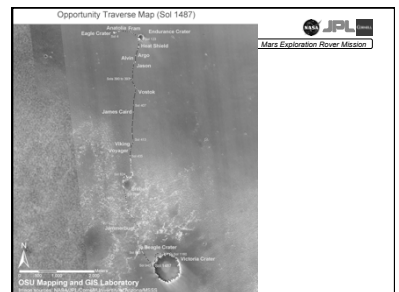
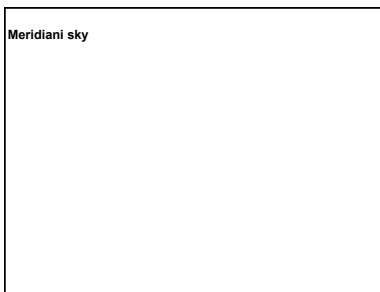
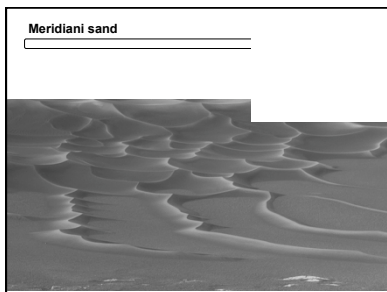
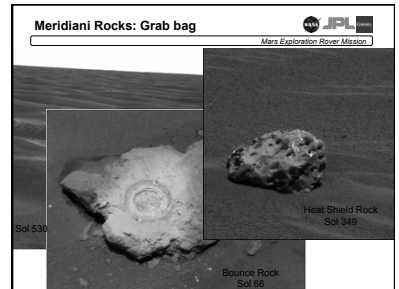
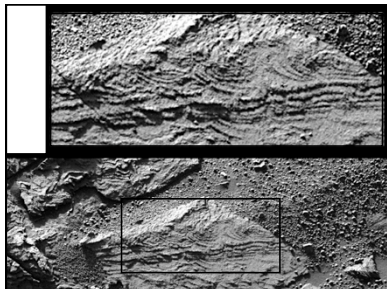
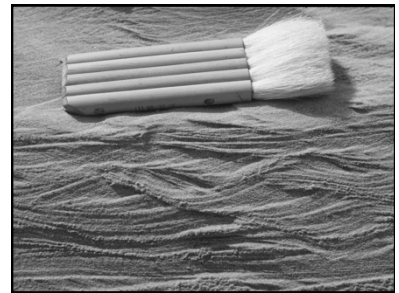
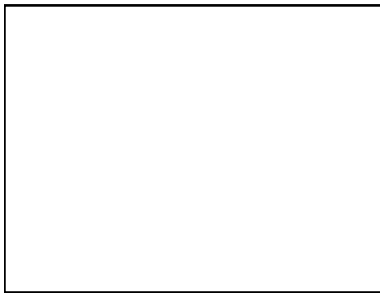
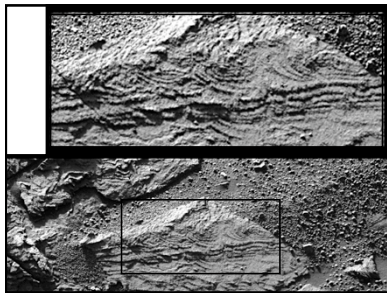


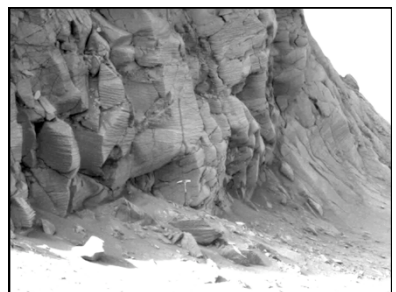
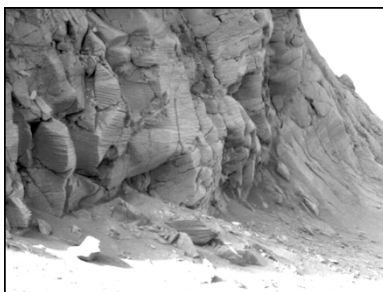
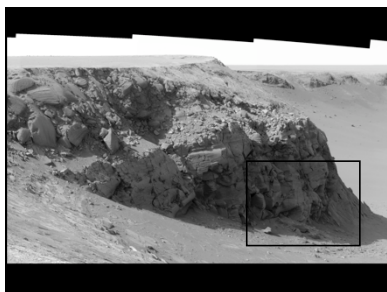
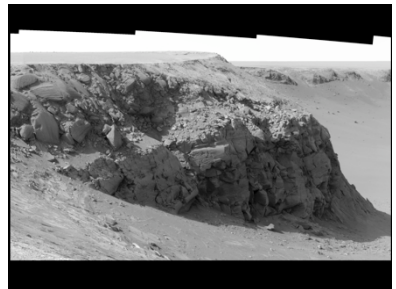
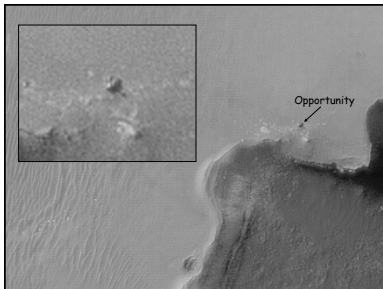
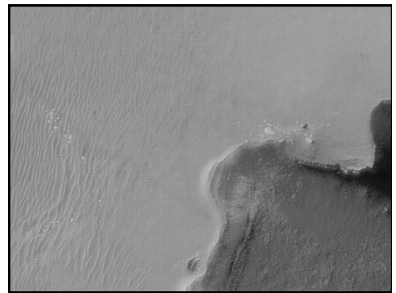
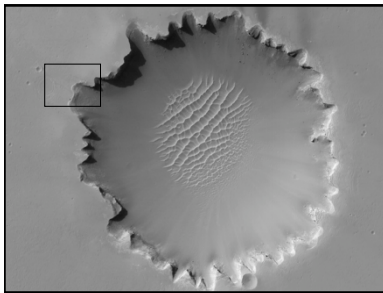
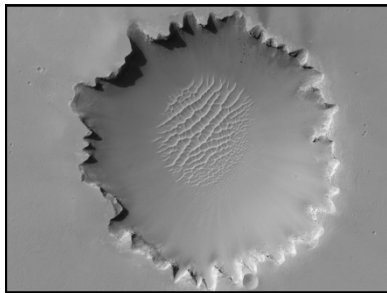
Opportunity: Mission Success

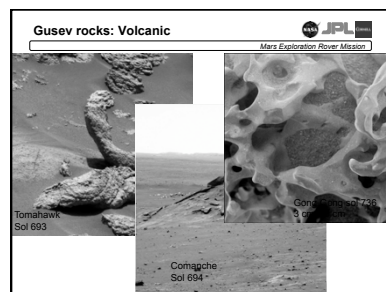
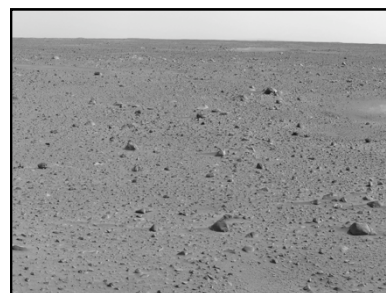
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Labels: El Capitan Sol 29, Overgaard Sol 690






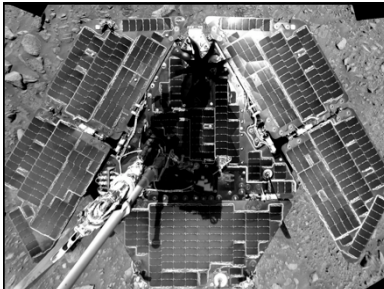





Wind and dust



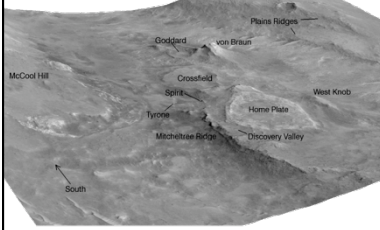
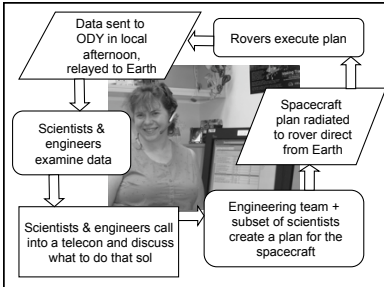
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Where next for Spirit?



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The Mars Exploration Rovers:


Still exploring

Still discovering

Still going....

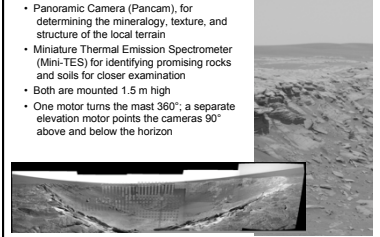


Mast-mounted instruments




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- Panoramic Camera (Pancam), for determining the mineralogy, texture, and structure of the local terrain
- Miniature Thermal Emission Spectrometer (Mini-TES) for identifying promising rocks and soils for closer examination
- Both are mounted 1.5 m high
- One motor turns the mast 360°; a separate elevation motor points the cameras 90° above and below the horizon



Arm-mounted instruments



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- Mossbauer spectrometer (MB) for mineralogy of iron-bearing rocks and soils
- Alpha particle X-Ray Spectrometer (APXS) for abundances of elements in rocks and soils
- Magnets, for collecting magnetic dust particles
- Microscopic Imager (MI) for close-up, high-resolution images
- Rock Abrasion Tool (RAT), for removing dusty and weathered rock surfaces and exposing fresh material

